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ABSTRACT

This document contains a description of the activities, concerns, findings, and recommendations of the Missouri Industrial Arts Study Project. It is intended to be a foundation on which the state's industrial arts programs, to be renamed "industrial technology education," can be built. The study summarized in this report was conducted by leaders from Missouri's industrial arts profession, teachers from large and small districts, teacher educators, supervisors, leaders of the state industrial arts association, and two representatives from industry. The report synthesizes the findings and recommendations into four sections. The first section presents the philosophy of education and foundation for the industrial arts program. It describes the social context of industrial arts education and suggests a name change for such programs. The second section describes the roles, missions, goals, and objectives of the state's industrial arts program. The third section offers a scope and sequence for an industrial arts program that includes provisions for courses, student flow, grade levels, students to be served, articulation, implementation, relationship to other curriculum areas, and the general nature of the program at each level of schooling. The final section suggests methods of implementation and long-range plans for the industrial arts program. Recommendations for the 1986-87 school year are included in the document, as is a six-page list of references. (KC)

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# TO BUILD A FUTURE!

## Findings and Recommendations of the Missouri Industrial Arts Study Project


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**Missouri Department of Elementary & Secondary Education**
**Division of Vocational & Adult Education**

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## Steering Committee Acknowledgement

The members of the steering committee express their appreciation for the dedication of the MOIASP's director, Michael Dyrenfurth; researcher, James Kyd; its staff and for the support of the University of Missouri-Columbia.

MOIASP Steering Committee
May 31, 1986

## A Special Request

This document reflects the best professional judgment of a dedicated team of professionals. However, it is a professional responsibility to continually evaluate new information and then to integrate the results of such evaluations into one's decisions. Consequently, the steering committee and project staff extend a special request to all. **Please share your facts, comments and impressions -- both favorable and unfavorable -- with us.** We ask only that they include a constructive component that would allow us to improve the product we proudly present to you.

Comments should be mailed to:

**The Missouri Industrial Arts Study Project**
**Room 103, Industrial Education Building**
**University of Missouri-Columbia**
**Columbia, MO 65211**

## From whence we sprang....

Above all, this document represents the commitment of the industrial arts profession, as manifested by the members of the project's steering committee, to helping Missouri's youth understand technology. I want to publicly acknowledge the committee's exceptional efforts and on behalf of Missouri's industrial arts teachers and students, and as project director, thank each committee member for his/her significant contribution. The entire profession and future generations are in debt to them.

Readers also need to know that this document is not just an isolated expression of opinion. Rather, it represents the systematic evolution of the position of the industrial arts profession -- an evolution carefully rooted in the excellence of the profession's ideals and history. As such, the committee built upon previous documents and actions and it reviewed most industrial arts guides, handbooks and reports. In recognition of the increasing strength and vitality of the profession's association, there was considerable interaction with, and direct involvement of, the Industrial Arts Association of Missouri. Additionally, because industrial arts education occurs within a larger educational context, considerable effort was expended to integrate the principal trends of the excellence thrust, the state's move to core competencies and the profession's embrace of technology education.

The MOIASP Steering Committee also thanks the many industrial arts colleagues in other states who have helped. They have openly shared their thoughts, project descriptions, and program documents with us. As appropriate, their ideas, phrases and concepts have been infused throughout this document. However, because of the nature of the report, it was inappropriate to footnote and acknowledge each idea or excerpt at the point of use. Instead, the project team appreciatively acknowledges the ideas of all who shared their materials and insights with us. It reflects most favorably on the profession that they are too numerous to mention individually.

Similarly, the project team made a concerted effort to hear the voice of the profession. All meetings were open and local, state and national leaders used these opportunities to provide much useful input. For such input, the project team wishes to thank:

Dr. Keith Blankenbaker
Dr. Scott Bradley
Mr. Joseph Burke
Mr. Gerald Bussen
Dr. Herman Collins
Dr. William Dugger
Dr. Neil A. Edmunds
Dr. Tom Winters
Mr. Louis Godla
Mr. James E. Good
Dr. Thomas Hughes
Mr. Daniel McMillen
Dr. Robert M. Nogueira
Ms. Kay Schaefer
Dr. Kendall Starkweather

Appreciatively,

Michael J. Dyrenfurth
Columbia, June 30, 1986

# OVERVIEW

This document contains a description of the activities, concerns, findings and recommendations of the Missouri Industrial Arts Study Project. As such, it will serve as a foundation upon which subsequent revision of the state's industrial arts programs, to be renamed **industrial technology education**, can be built.

Funded by a grant from the Missouri Department of Elementary and Secondary Education's Division of Vocational and Adult Education, this project drew together a steering committee of ten professionals who committed themselves to many hours of challenging work to build a better future for Missouri's youth. These leaders were carefully selected to represent Missouri's industrial arts profession; teachers from large and small districts, teacher educators, supervisors and leaders of the state industrial arts association. In addition, two representatives of industry provided particularly useful perspectives on the challenge of working toward a program that better reflects our technological world.

This steering committee met five times at locations throughout the state. It received and reviewed input, in oral and written forms, from more than 30 national, state and local leaders. Together with the project director, its researcher, and the state industrial arts supervisor, the committee considered the input and formulated plans for the future. It also examined the emerging response pattern of other leading state's industrial arts reforms and those advanced by the International Technology Education Association and the Industrial Arts Division of the AVA. Finally, and only after much deliberation of alternatives, the committee selected and integrated the most appropriate choices and synthesized these in this report -- **a document which presents a goal our field must strive for!**

# SECTION I: PHILOSOPHY & FOUNDATION

## PHILOSOPHY

### Findings: Social Context

Contemporary and future society are clearly different from what America experienced during its first industrial revolution. To be sure, some elements of the industrial revolution remain, but many more have changed. Technology as a force has affected most facets of our existence, and thus technology seems to be the single most distinctive characteristic that sets current and anticipated futures apart from previous ones.

Evidence of this is seen in the literature. Note, for example, the frequent references to the post-industrial society, to the demise/reduction of *smoke stack* industry and to the information society. Furthermore, we have seen tangible evidence of this shift in our automotive, steel, petroleum and electronics industries.

The private sector has been required to grapple with technology engendered issues such as productivity, technological capability and global competitiveness. Its workers have been challenged by the need for currently marketable skills -- in cognitive, affective and psychomotor domains -- in order to maintain their ability to support themselves and contribute to our free-enterprise economy. Furthermore, given technology's advances, our workers find these skills to be constantly changing.

Similarly, legislators have been pressed to understand technology and its effects as they attempt to frame policies for the public good. Given the exponential proliferation of technology and its complexity, it is increasingly difficult for people to exercise appropriate citizenship functions, particularly given the curtain of confusion engendered by technology and its media offspring.

Citizens have found themselves bewildered by increasingly complex consumer decisions. Often they face decisions involving trade-offs between immediate gain for long-range unknowns or even known but preferably ignored negative consequences, e.g. the effects of toxic wastes. Similarly, recreational environments and activities have increasing technological components, as do our personal and societal learning activities.

Technology's pervasive influence has permeated even our homes. Our lifestyle is timed, microwaved, accelerated, recorded, computerized and confounded. A greater proportion of people are working, families are resorting to schedules to program their contact and others are unemployed due to technological advances.

More outside knowledge is pouring into the home via television and other media. Then too, the tensions from the external aspects of life, many of which are technologically induced, do come home in the form of stress.

Even in social service arenas such as the health sciences, technological capabilities have caused us to ponder when enough is enough. We ask, for example, to what end do we operate life support systems in situations currently deemed hopeless?

**Findings: Implications For Education**

Given the pervasive nature of technology, the profession raises the question: ***"Where do people develop the understanding, skills and attitudes to deal with forces such as technology?"*** Clearly our society uses formal schooling as a principal method to this end -- at least for youth, and currently in increasing numbers, for adults.

It follows then that one must ask, ***"What are the schools doing to help youth and adults address technology's challenges?"*** What systematic efforts are in place to develop technologically appropriate understanding, skills, and attitudes in elementary, secondary, postsecondary, adult and continuing education?

Furthermore, given the committee's humanistic posture, it is important to note that the preceding questions are framed with the intent of helping the client learn to control technology rather than merely being trained to adapt to it!

The committee ***has not yet found evidence of any widespread, systematic, school-based program comprehensively addressing technology in Missouri.*** Although some other states are implementing such a thrust, no statewide program exists in Missouri. However, after an assessment of the industrial arts profession's capabilities, the committee decided that because of the overall orientation of its teachers, and because of its large, in-place capacity for providing technologically oriented courses and laboratory experience, the industrial arts profession -- more than any other school subject field -- represented the best possible and most feasible group to offer such a program. The committee also came to realize that, although technology as a discipline simply is too large for any single school subject to address in total, it should indeed be possible to sample it appropriately.

## Recommendations

**The steering committee concludes that industrial technology education programs should teach about industrial technology and should do so in a way that serves as a vehicle to build understanding, skills, and attitudes that can be generalized and applied in other technologies. Furthermore, because all people are affected by technology, the committee concludes that a minimum of one semester-long course experience in industrial technology should be required of all Missouri's junior/middle school youth.**

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## Findings: The Nature of Industrial Technology's Implementation

In reflecting on the nature of industrial technology, the committee also noted the findings of key educators, psychologists and philosophers. Namely that not only is learning by doing, i.e. working with real objects, a vital component of education, but it is increasingly important for younger students. Given the trend to an information society, schools could easily become entirely media or print-based, a shift that would bring with it the elimination of other learning modes. Similarly, the committee observed the contributions of vocational student organization activity to the individual's development.

## NAME

### Findings

Currently the profession spans a continuum of opinion with regard to its name. Its membership ranges from advocates of technology education to those favoring maintenance of its current name, industrial arts.

There seems to be some evidence to indicate that implementation of technology education may in fact be a highly desirable long-range goal for education. However, despite some claims by perhaps overly zealous industrial arts-spawned technology education advocates, there are clearly other service providers who also have legitimate claim to, and actual capability for providing, some part of technology education. The committee's conclusion is that currently no single school discipline can rationally accept responsibility for delivering all that is encompassed by the term ***technology education.***

Industrial arts educators have, since at least 1904, addressed the content of industry. Given the fact that industry uses technology to attain its goals, it follows that industrial art's content must be derived from industrial technology. Therefore, if the industrial arts' content derives from industrial technology, why not its name? Other disciplines such as mathematics, science and English take their names from their content -- why not ours?

**Recommendation**

**Consequently, this committee recommends that in the state of Missouri the thrust of the industrial arts discipline be refocussed by changing its name to *industrial technology education*.**

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**Findings: The Industrial Arts/Industrial Technology Education Program**

Although the committee noted a lack of systematic effort wholistically addressing technology in Missouri's schools, they did confirm the existence of a program -- the industrial arts program -- that is being reshaped to better address societal needs for a basic understanding of technology. More specifically, the committee concluded that a technologically relevant **industrial technology education** program is both a necessary and feasible and important way to address the development of the technological capability of Missouri's students, both youth and adults.

**Recommendation**

**The committee recommends that Missouri's industrial arts program be restructured to reflect industry and professional practice with greater fidelity and that its new name, *industrial technology education*, be used to symbolize this.**

.....

**Summary Recommendations**

**In summary and to lend context to the preceding recommendations, the committee recommends that Missouri's industrial arts program:**

- **Become known as *industrial technology education***
- **Derive its content from the technology used by industry**
- **Be composed of three components:**
  - **--Formal study**
  - **--Laboratory/hands-on application**
  - **--Student organization activity**

## SECTION II: ROLES, MISSIONS, GOALS AND OBJECTIVES

### Findings: Rationale

Since industry and technology are distinctive characteristics of the American culture, and since one of the key purposes of education is to transmit the culture to future generations, it follows that it is necessary for the schools to provide youth with an insight into, an understanding of, and selected capabilities with, the technological nature of this society. Industry and technology spring from the human ability to reason, solve problems, create, construct, and use materials, tools, machines and processes imaginatively. Because these abilities are an integral part of our technological culture they should be developed in all students -- regardless of their educational goals or occupational aspirations.

Society's response to these aspirations and forces has been to evolve a school-based program called **industrial technology education**. This program was implemented to help students understand industrial and technological evolution, thereby forming a base of organized values and attitudes that facilitates their adjustment to changing technological environments. Also carefully developed is an increased capacity to participate in society by using technological means for creative solutions to present and future individual and societal problems -- a capability that will enable students to better control technology in their lives.

### Recommendations

**In light of the preceding, the committee recommends that the mission of *industrial technology education*, formerly known as industrial arts, as an essential component of Missouri's education system be:**

1. **To serve as the component of general education that develops generalizable understandings, capabilities, values and attitudes related to industrial technology in <u>all</u> youth.**

2. **To serve as a component of specialized education that contributes to meaningful occupational choice and/or preparation in a technological society.**

.....

**Findings: Mission**

The overarching mission of **industrial technology education** as a school program is to develop the human potential of all students for responsible work, citizenship and leisure roles in a technological society. To accomplish both of its designated educational roles, **industrial technology education** programs must systematically plan to address each domain of the mission -- cognitive, affective and psychomotor.

**Recommendations**

**The committee concludes that every industrial technology education program in Missouri must address each domain of the program's mission and that these are to:**

1. **Develop each person's ability to comprehend and apply the concepts of industrial and technological systems.**

2. **Develop each person's values and attitudes related to the appropriate use of industrial technology -- its tools, machines, materials, processes and products.**

3. **Develop each person's ability to use materials, technological processes and hardware to achieve constructive work skills and enhance occupational opportunity.**

.....

**Findings: Relationships Between State Goals of Education and Industrial Technology's Goals**

Missouri has a fine record of securing broad participation in the establishment of goals for the state's educational system. Essentially these goals represent the desired outcomes of every individual's participation in schooling. These outcomes represent four major categories of development: intellectual, physical, social and career. Although these goals have recently been translated into a set of measurable core competencies and key skills, they still slight technological capabilities.

The committee's review of industrial arts/technology education projects in other states revealed the importance of such statements of state educational goals. State goals were used as roots from which technology-specific goals were derived. In essence, the state goals served as the ultimate anchor for an audit trail connecting each of **industrial technology education**'s goals to one of the purposes (for existence) of the state's educational system. This finding carries with it the implication that **industrial technology education** will only address goals that can be traced to one of Missouri's state goals for education and that the core competencies and key skills will be appropriately incorporated and reinforced.

**Recommendation**

**Missouri's *industrial technology education* programs will only address goals that can trace directly to a state goal for education.**

.....

**Findings: Industrial Technology Education's Goals**

The committee reviewed more than twenty five lists of professional association and state goals for industrial arts and/or industrial technology programs. A high degree of similarity was noted although the actual words and format varied widely. Furthermore, the committee found that its own sense of the program's goals represented a synthesis of much of what was reviewed. Since the group's views were not particularly conservative or leading-edge in nature, the committee clearly represents the mainstream of the profession.

**Recommendations**

**The steering committee advances the following synthesis of goals as its recommendations for Missouri's *industrial technology education* program. Every student participating in any implementation of the industrial technology education program should experience a systematically designed program of instruction and activity that:**

1. **Develops an understanding of, and capability with, industrial technology.**

2. **Develops an understanding of industrial processes and the practical application of mathematics, scientific and technological principles in industry.**

3. **Develops basic skills in the safe use of tools, machines and processes as used by industry.**

4. **Develops technological problem solving skills and attitudes.**

5. **Fosters creativity in using technology for desirable purposes by encouraging students to experience the act of creating, from materials and with technological processes and hardware, new and different forms which have greater or alternative value.**

6. **Contributes to meaningful occupational choice by developing an understanding of industrial and technological career opportunities and their requirements.**

7. **Through laboratory activity causes discovery of individual talents, aptitudes, interests and potentials related to industry and technology.**

8. **Encourages cooperative attitudes, contructive work habits, and other traits that will help secure and maintain employment.**

9. **Engenders a pride in work done well.**

10. **Develops consumer skills related to the appropriate production, consumption and maintenance of technological goods and services.**

11. **Reinforces general education's basic skills by providing practical applications of their knowledge, attitudes and skills.**

12. **Prepares for entrance into advanced secondary and post-secondary vocational/technical programs by promoting the development of occupational skills and interests.**

13. **Provides an alternative learning modality for those who learn better in settings other than the conventional classroom.**

14. **Encourages the development of attitudes reinforcing the free enterprise system.**

15. **Stimulates leadership behavior by student organization activity.**

.....

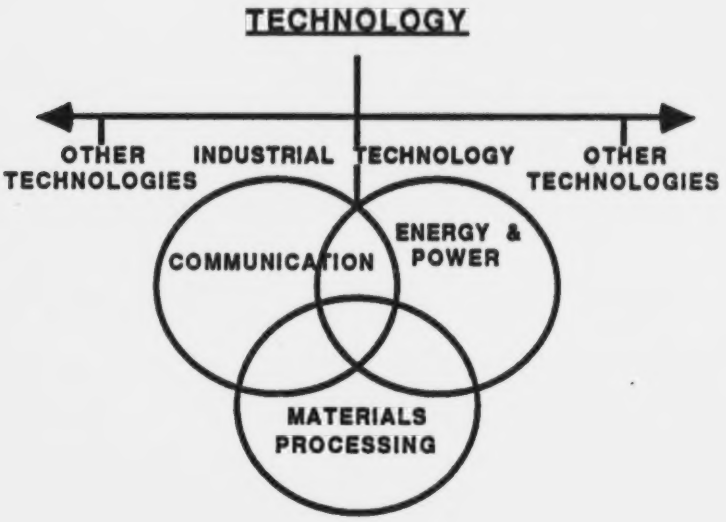
**Findings: Content**

Although in our material and technological society not everyone is a producer, all are consumers and users of the products of industry and its technology. Therefore, **industrial technology education** as a school program draws its content from industry and the technology it uses to achieve its ends. Content is also selected by analyzing competencies individuals need to effectively use the products of a technological society.

Given the preceding philosophy and foundation, it is clear that the educational program known as **industrial technology education** derives its content, i.e. the subject matter it teaches, from industry. More specifically, this program focuses on the technology which industry uses to accomplish its ends. Obviously, this content is called industrial technology. It often is considered to be a body of knowledge or a discipline. As such, industrial technology is a subset of technology as shown by Figure 1.

It should be noted that this name, **industrial technology**, when used with the object education, refers to the profession that engages in delivering the content to students. Consequently, there are two contexts in which the term industrial technology can be used. In this section dealing with the subject matter of the program, reference is consistently to the use of industrial technology as content.

**FIGURE 1. Relationship of technology to industrial technology**




An analysis was conducted to identify the appropriate structure of industrial technology's content. The committee found other states using a variety of clustering schemes. Three, four and five clusters were often contained in their implementation plans. Cluster names included communications, visual communications, graphic communications, energy, power, energy and power, transportation, manufacturing, construction, materials processing and enterprise.

## Recommendations

**After reviewing the nature of industrial technology content as found in the literature of other pioneering state projects, the steering committee recommends, as shown in Figure 1, that:**

1. **Industrial technology be considered the use of technology by industry. As such, industrial technology coexists with agricultural and other technologies.**

2. **Industrial technology be considered to consist of three clusters; Materials Processing, Energy & Power, and Communication.**

.....

## SECTION III: SCOPE AND SEQUENCE

### Findings: Scope and Sequence

The committee ascertained that a scope and sequence document essentially serves as a blueprint for the implementation of an education program that causes students and teachers to come together in appropriate facilities to work together toward attainment of the goals specified for the program. As such, the scope and sequence documents:

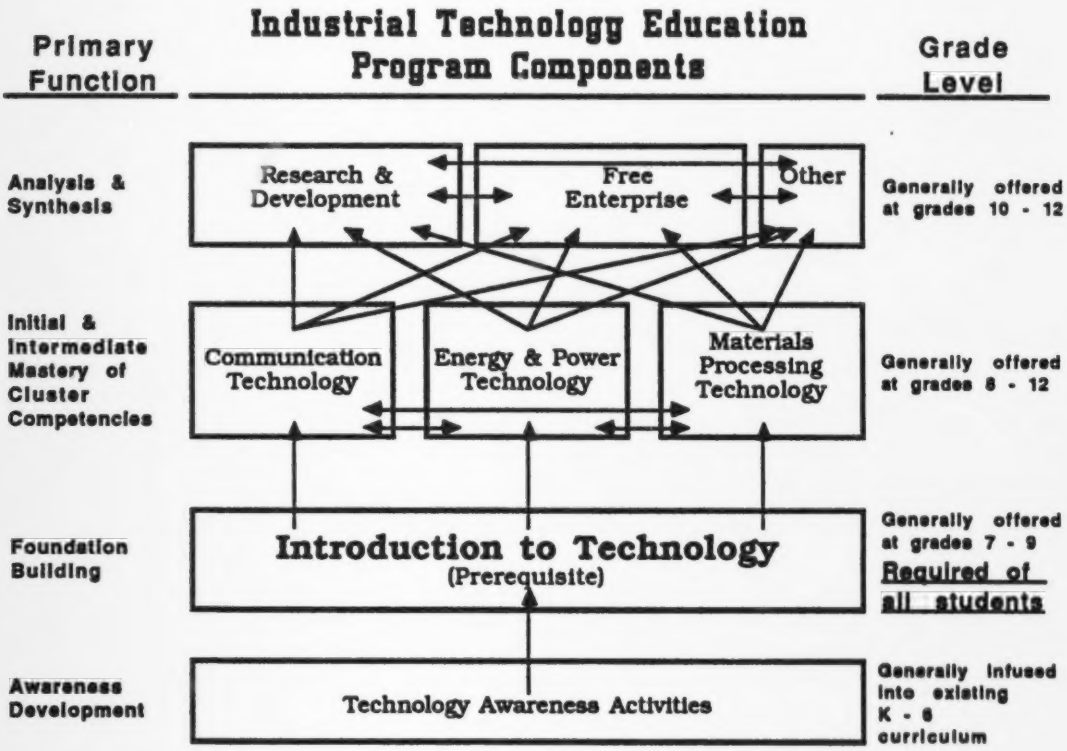
1. The courses (names and content) that comprise a program
2. The pattern of student flow through these courses (i.e. prerequisites)
3. The range of grade levels at which it is appropriate to offer each course
4. Which students are to be served
5. The interface between the program and other curriculum areas at the same level
6. Implementation patterns that accommodate varying school and/or program sizes
7. Articulation provisions with other programs at subsequent levels of education
8. The general nature of the program at each level of schooling.

### Recommendations

**After review of the work in other states and also that of other subjects, such as home economics, the steering committee documented its conclusions in the statement of *industrial technology education's* scope and sequence. In this the committee recommends that:**

1. **Missouri's industrial technology education program be structured as shown in Figure 2.**
2. **Technological awareness be developed by infusing a set of technology-based learning activities into the regular ongoing elementary school curriculum. These activities should be designed to enhance mathematics, science and social studies curricula with practical applications. One or more of the school's or system's industrial arts teachers should be assigned (on load) to serve as resource person(s) to support infusion.**

Figure 2. Recommended program structure for industrial technology Education



3. The *Introduction to Technology* course be required of ALL students in each of Missouri's school systems. This course should be a minimum of a semester in length and it must involve a systematic explanation of the most important tools, machines, materials and processes of industrial technology. This course must contain key elements of each cluster, it cannot focus on only one cluster. Where interest and/or enrollment warrants, this course may be offered at any grade level and students may enroll again in subsequent years. This course is a prerequisite to all other industrial technology education courses.

4. One or more separate courses in each cluster comprise the third level of experiences in *industrial technology education*, as shown in Figure 3. Alternatively, one course spanning all three clusters and entitled Exploration of Technology may be offered. However, if multiple courses within any single cluster are offered, they must include a prerequisite quarter or semester course spanning the breadth of that cluster. Subsequent courses within the cluster may reflect any appropriately specified area of that technology. After taking the first course in any cluster, students may:

   a. Take any second level course in that cluster
   b. Take the first course in any other cluster
   c. Advance to take any analysis & synthesis course.

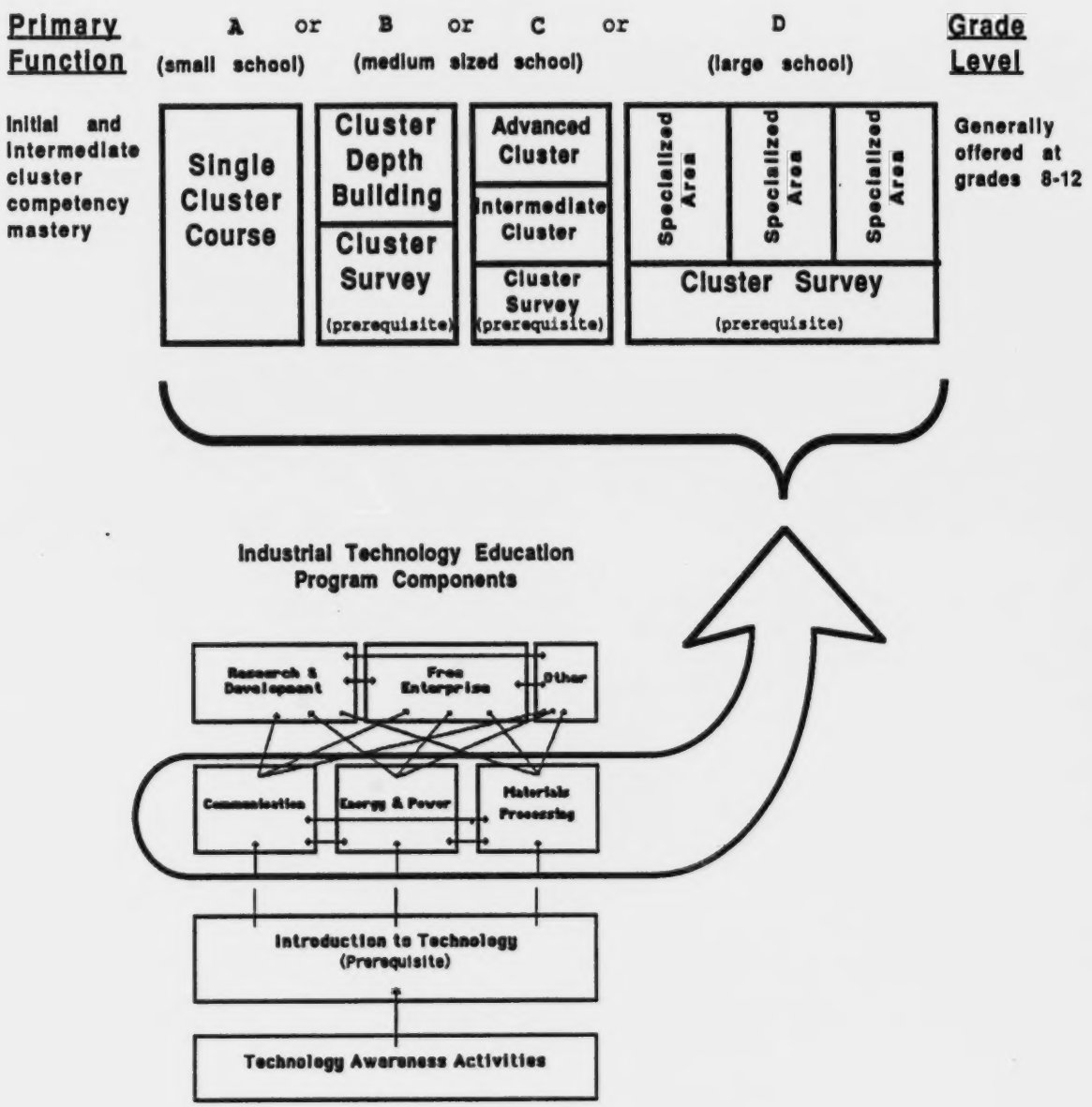
5. A complete *industrial technology education* program must offer one or more courses at the analysis or synthesis level. These could build analytical skills, (e.g. a Research and Development course might investigate the nature of metallic, synthetic and organic materials and testing procedures); they could apply previously learned capabilities to the challenges of our free enterprise system (e.g. students could design a product or service, establish and finance a company, produce the product or service and market it); or alternatively, these courses could be designed to build in-depth knowledge for a vocational or pre-technical preparation.

6. Quality *industrial technology education* programs systematically incorporate careful articulation plans and agreements that facilitate student movement to: advanced educational opportunities offered by vocational, technical or college institutions; the world of work; and/or other opportunities such as entrepreneurship. The articulation plan shows how the program contributes to and articulates with advanced vocational, technical and post-secondary educational opportunities as well as the world of work.

7. Each school establish its own scope and sequence that is compatible with the principles listed here. In doing so, the school needs to consider its overall enrollment, level of support and the nature of its community and industry.

   As a minimum, however, every *industrial technology education* program must include the components shown in Figure 4.

## Figure 3. High School Curriculum Options for Offering Industrial Technology Education Clusters



8. State approved *industrial technology education* courses be restricted to a more cohesive set of offerings, such as those shown in Figure 5.

9. Technology Specialization II courses, shown in Figure 5, may be taught at the Analysis & Synthesis level at local option.

10. For each *industrial technology education* course, and regardless of content, focus or level, instructors should develop a systematic plan to address the interface between the content and objectives of that course and those of:

    a. Mathematics
    b. Science
    c. Social Studies
    d. Oral and written communication
    e. Careers in the field
    f. Other areas such as computer technology

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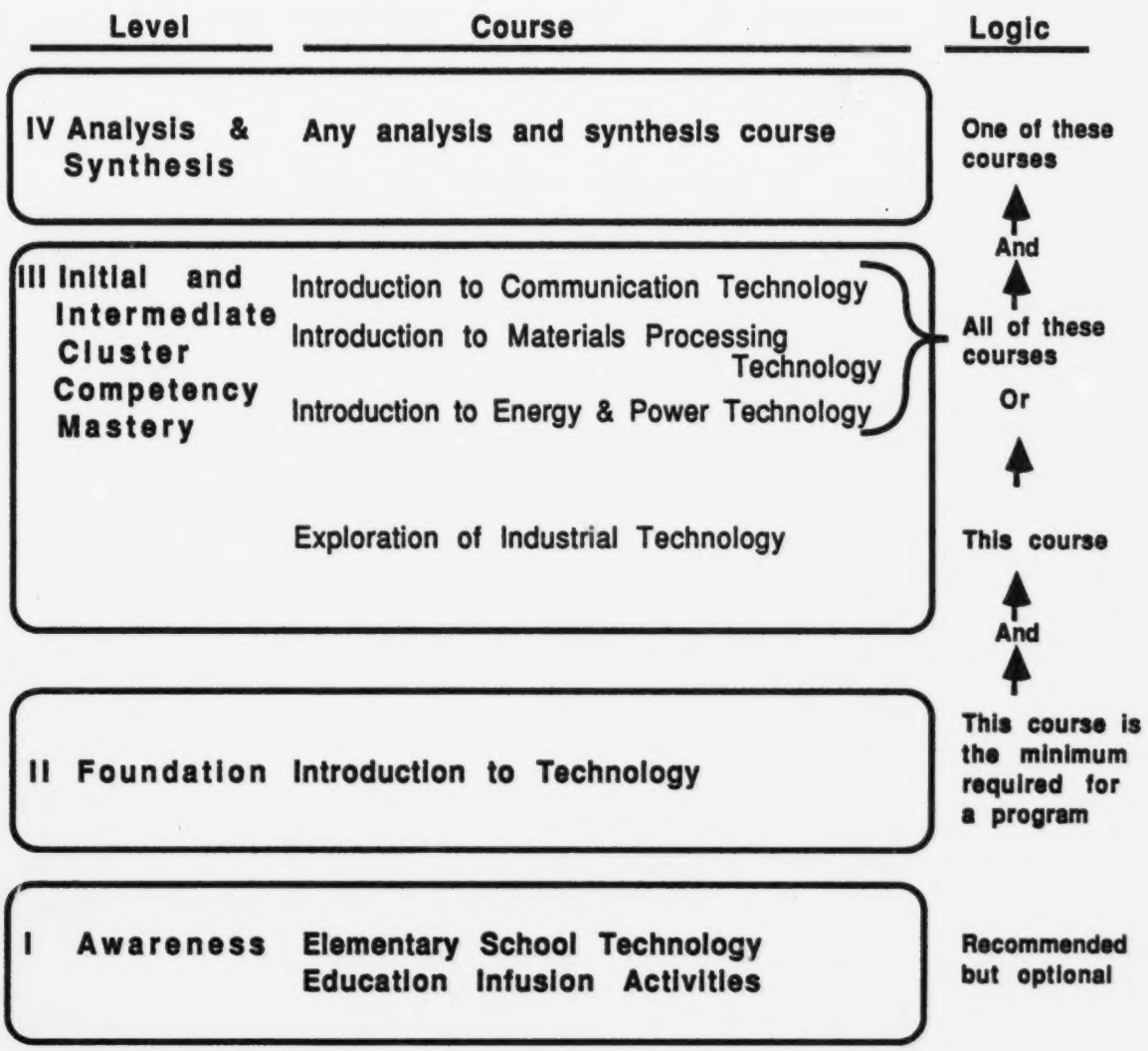
**Figure 4. Essential industrial technology education program components**



## Figure 5. Sample list of industrial technology education courses consistent with scope and sequence recommendations

| Grade Level | Primary Function | Course Name | Course Content |
|---|---|---|---|
| 10-12 | Analysis & Synthesis | Various descriptive titles are possible | Any content that requires students to synthesize and apply previous industrial technology-derived competencies and/or build depth in a particular technological area |
| | | Research & Development | An individually planned and executed investigation of the theory and practice of a significant facet of industrial technology |
| | | Free Enterprise | A course wherein students design and produce goods or services for sale |
| 10-12 | Intermediate Cluster Competency Mastery | Technology Specialization II<br>• Materials Processing<br>--Wood Technology<br>--Metals Technology<br>--Plastics Technology<br>--Numerical Control Technology (CNC/CAM/CIM)<br>• Energy & Power<br>--Digital Electronics Technology<br>--Engine Technology<br>--Alternative Energy Technology<br>--Microprocessor Technology<br>--Robotics Technology<br>• Communication<br>--Drafting Technology<br>--Photography Technology<br>--Computer Assisted Design Technology<br>--Engineering Graphics Technology | Any specialization course that builds upon a Technological Specialization I course in any cluster |

**Figure 5. Sample list of industrial technology education courses consistent with scope and sequence recommendations, continued**

| Grade Level | Primary Function | Course Name | Course Content |
|---|---|---|---|
| 9-12 | Initial Cluster Competency Mastery | Technology Specialization I | Any appropriate first level specialization course within any given cluster |
| | | • Introduction to Technology III | |
| | | • Materials Processing<br>--Introduction to Construction Technology<br>--Introduction to Manufacturing Technology<br>--Introduction to Materials Technology | |
| | | • Energy & Power<br>--Introduction to Transportation Technology<br>--Introduction to Power Technology<br>--Introduction to Electronics Technology | |
| | | • Communication<br>--Introduction to Graphic Communications Technology<br>--Introduction to Electronics Communications Technology<br>--Introduction to Media Communications Technology | |
| 8-12 | Cluster Exploration | Introductory Cluster Courses<br>-- Introduction to Materials Processing Technology<br>-- Introduction to Energy & Power Technology<br>-- Introduction to Communications Technology | |
| | | Introduction to Technology II | |
| 7-10 | Foundation | Introduction to Technology I | |
| K-6 | Awareness | Elementary School Technology Education Activities | |

## SECTION IV: IMPLEMENTATION AND LONG-RANGE PLAN

The Missouri Industrial Arts Study Project steering committee recognized from the start that a mere document describing only the status of industrial arts would not have much of a beneficial effect. Nor would a document offering grand aspirations be effective. What was needed, however, was a carefully structured implementation plan -- strongly supported by the combined efforts of the state Department of Elementary & Secondary Education and the profession! Furthermore, the steering committee noted that this effort must continue for some time before significant change can be expected.

The design of such a plan was the goal of the Missouri Industrial Arts Study Project. The near-term activities are the most important and the longer-term ones constitute a long-range plan for the improvement of the profession.

**Findings: Long-Range Plans**

The steering committee identified and examined several fine examples of long-range plans to improve the practice of the profession. Those of New York, New Jersey, Texas, and the ITEA were notable samples. The IAAM's own long-range plan was also reviewed. Analysis of these documents revealed several key principles:

1. Continual systematic effort is needed to achieve wide-spread change.

2. The Missouri Department of Elementary & Secondary Education and its industrial arts supervisor, teacher education institutions, local education agency supervisors, the state industrial arts association and leading edge teachers are the principal change agents.

3. To achieve significant program improvement, all change agent forces must consistently focus on the same goal.

4. All activities in the program improvement plans can be classified into one of the following categories:

   - Professional and Leadership Development
   - Program/Curriculum Development
   - Strengthening Supervision
   - Public Relations and Advocacy Thrust
   - Teacher Education (Preservice)
   - Pilot, Demonstration and Exemplary Programs
   - Research

5. Available funding is best redirected to encourage transition to **industrial technology education**. Only change should be funded.

## Recommendations

The steering committee recommends the following activities, listed in order of priority within each category, as necessary to the long-range improvement of *industrial technology education* in Missouri. Each is carefully selected to provide the support and initiative needed to help Missouri's industrial arts program make the transition to become a dynamic and contemporary program that clearly reflects industrial technology. These recommendations are presented in seven categories.

A. Professional and Leadership Development
B. Program and Curriculum Development
C. Strengthening Supervision
D. Public Relations and Advocacy
E. Teacher Education (Preservice)
F. Pilot, Demonstration and Exemplary Programs
G. Research

### A. Professional and Leadership Development Activities

1. Have Missouri's Department of Elementary and Secondary Education, the Industrial Arts Association of Missouri, and teacher educators cooperatively develop and annually update a long-range plan for the improvement of industrial technology education that systematically organizes and prioritizes all *industrial technology education* activities.

2. Develop and coordinate a systematic, state-wide professional development plan for *industrial technology education* instructors.

3. Implement an annual *industrial technology education* leadership development activity.

4. Conduct credit-bearing *industrial technology education* program improvement workshops to disseminate the revised *industrial technology education* handbook and initiate local program planning activity.

5. Conduct regional curriculum implementation workshops for the Introduction to Technology course.

6. Conduct regional curriculum implementation workshops for each cluster (communications, energy and power, materials processing).

7. Conduct a competition for exemplary "ideas that work" among classroom teachers who then conduct a one day improving instruction in Industrial Technology Education institute twice each year.

8. Conduct an equity workshop for *industrial technology education* instructors.

9. Conduct a workshop to enhance the special needs skills of *industrial technology education* instructors.

## B. Program and Curriculum Development

1. Conduct annual meetings to publicize the profession's long-range improvement plan, to report progress and to seek input for subsequent revision of activities and/or their relative priority.

2. Develop a curriculum guide for the Introduction to Technology course.

3. Develop curriculum guides for each of the three cluster introductory courses (communications, energy and power, materials processing.

4. Develop curriculum guides for the Research and Development and Enterprise courses at the synthesis level of the *industrial technology education* program.

5. Adapt the Industrial Technology Education Association's national standards to fit Missouri's needs, then secure their formal adoption.

6. Develop a guide to assist each district in program revision and implementation of an *industrial technology education* program.

7. Develop a Missouri industrial technology student organization handbook.

8. Develop a guide to interfacing *industrial technology education* programs with mathematics, science, English and social studies curricula.

9. Develop an *industrial technology education* facilities design, renovation and improvement guide.

10. Develop an *industrial technology education* laboratory management guide.

11. Promote revisions of student contests on local, regional, and state levels to both reflect the program revisions and encourage transition toward *industrial technology education.*

12. Develop a guide to serving special needs students in *industrial technology education.*

13. Develop a guide to infusing technological activities into the elementary school curriculum.

14. Develop an equity guide for *industrial technology education* instructors and programs.

## C. Strengthening Supervision

1. Increase the number of people assigned to provide *industrial technology education* leadership at the regional and/or state levels through the Department of Elementary and Secondary Education. The added responsibilities that need to be addressed include the coordination and encouragement of the initiation of industrial technology student organizations, program evaluation and support for program change.

2. Establish an ongoing state-wide advisory council to contribute direction to the *industrial technology education* profession.

3. Establish a state-wide council to coordinate *industrial technology education* inservice, professional development activities, and summer workshops.

4. Revise the state evaluation and assessment standards for *industrial technology education* courses and district programs to be consistent with the new industrial technology education handbook. All evaluations should be adaptable to both small and large, and rural or urban school districts.

5. Develop a set of recommendations for the revision of North Central Association's accreditation standards and submit them to that organization.

6. Search out and secure additional funding to assist districts in equipment acquisition, facility renovation, etc. This funding would be in addition to the present level of funding through the Grant Awards Program and is not meant to replace it.

7. Coordinate Missouri program evaluation criteria to those of NCATE and the Council of Technology Teacher Education.

## D. Public Relations and Advocacy

1. Disseminate a greatly increased amount of information through frequent regional workshops, newsletters, on-site visitations, association meetings and the like.

2. Develop and implement an organized publicity campaign, including a slide tape presentation as one component, to inform key groups of the scope of *industrial technology education* at local, regional, and state levels. This campaign should first include teachers within our profession and then quickly move on to include other disciplines' teachers, counselors, principals, superintendents, parents, legislators, business, industry and the general public.

3. **Develop contacts promoting input from, and cooperation with, other organizations and associations connected with technology, such as the Missouri Corporation for Science and Technology, the Industrial Arts Association of Missouri, the Missouri Vocational Association, the Society of Manufacturing Engineers, the Principles of Technology Project and the like.**

4. **Promote state-wide student competition in contests that reinforce the *industrial technology education* program's objectives.**

5. **Hold an annual Technology Festival and publicize it appropriately.**

## E. Teacher Education

1. **Reorganize and revise teacher education programs in Missouri's higher education institutions to reflect current revisions of the philosophy of *industrial technology education*.**

2. **Implement an active program to recruit students, particularly women and minorities, to industrial technology teacher education.**

3. **Revise teacher certification requirements to better prepare new teachers for the challenge of teaching *industrial technology education* and to facilitate certification reciprocity with other states.**

## F. Pilot, Demonstration and Exemplary Programs

1. **Designate and fund *industrial technology education* demonstration centers to pilot test new curricula and serve as examples for others.**

2. **Disseminate, at no cost, each revised *industrial technology education* handbook and/or guide to each industrial technology supervisor, superintendent and curriculum director, and teacher education program in the state.**

3. **Fund a pilot project to implement ten demonstration sites for local *industrial technology education* program advisory councils and produce a guidebook for their implementation and use.**

4. **Encourage the development of local, regional and state-wide networks of *industrial technology education* student organizations.**

## G. Research

1. **Incorporate the systematic collection of *industrial technology education* data into the ongoing Vocational Education and Department of Elementary and Secondary Education data collection process.**

2. Develop an *industrial technology education* resource center, housed within Missouri's Vocational Resource Center, to collect and disseminate sample strategies for adding technology units--with activity packages, curriculum guides, evaluation forms, etc. These should be designed for various levels of expenditures and should be available for distribution to teachers at no cost.

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## Recommendations For Next Year

1. That the state fund a revision of the Missouri Industrial Arts Handbook to reflect the findings and recommendations of the 1985-86 Missouri Industrial Arts Study Project.

2. That an additional full-time state supervisor be allocated to help *industrial technology education* make the transition called for by this report by implementing the recommendations of this report.

3. That a minimum of $50,000 of additional funding be allocated to address professional development needs in 1987-88 and succeeding years.

4. That the criteria for the 1987-88 Industrial Arts Grant Awards Program be revised to fund significant program change in the direction of *industrial technology education.*

5. That a college credit granting leadership development institute be funded by the Missouri Department of Elementary and Secondary Education, during January-May 1987, to strengthen the capabilities of 30 leaders selected by a nomination process.

6. That the Missouri Industrial Arts Study Project's professional improvement plan recommendations be the topic of a three hour workshop session during the 1986 and 1987 MVA conferences.

7. That the Industrial Arts Association of Missouri make immediate revisions in the state industrial arts awards contest to reflect directions highlighted by the Missouri Industrial Arts Study Project.

8. That a monthly newsletter be instituted by the Industrial Arts Association of Missouri and that it be supported by state funds and activity to help facilitate the transition to *industrial technology education* by increasing communications and raising awareness of professional development events.

9. That the state establish five pilot and demonstration sites to assist in the development and field testing of new materials in 1987.

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## POSTSCRIPT

The steering committee urges all industrial arts/technology educators to join ranks and work together to address the priorities identified in this report. Concerted action is needed to achieve the improvements so urgently needed to meet technology's challenge. Real change is possible when teachers and their associations, supervisors, teacher educators, business and industry, and state Department of Elementary and Secondary Education leaders work together. Missouri's future generations deserve no less. **Let's build the future now!**

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